

EXCERPTS

FROM PROFESSOR HUGO SCHULZ'S TREATISE

ON EUCALYPTUS OIL.

TRANSLATED AND SUPPLEMENTED BY

BARON SIR FERD. VON MUELLER, K.C.M.G.,

F.R.S., M.D., PH.D., F.G.S., &C., &C.,

GOVERNMENT BOTANIST IN VICTORIA.

Reprinted from "The Australasian Medical Gazette" for 1883.

L. BRUCK, MEDICAL PUBLISHER,

35 CASTLEREAGH STREET, SYDNEY.

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REFERENCE

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p. 29968
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SYDNEY:
JOHN SANDS, PRINTER,
GEORGE STREET.

EXCERPTS

FROM PROFESSOR HUGO SCHULZ'S TREATISE

ON EUCALYPTUS OIL.

PROFESSOR HUGO SCHULZ, of Greifswald, while connected with the University of Bonn, enriched the scientific literature with an important publication, entitled "Das Eucalyptus-Oel, Pharmacologisch und Clinisch dargestellt," 1881, and thus brought together what mainly was known on the subject up to that time, his essay also being replete with original observations, chemical, physiological, and medicinal. Strangely enough, in the very lands of the Eucalyptus their medicinal properties, though powerful and safe, have obtained hitherto but very inadequate professional recognition in either medicine or surgery. Still, Eucalyptus-oil and several purchasable Eucalyptus preparations have made their way to some extent as popular or domestic remedies in Australia also. Absence of malarian fevers from most parts of the Australian territory may account to some extent for the very limited use into which the Eucalypti are drawn by legitimate therapy in this part of the globe. But we have now such

overwhelming testimony of the special value of the oil as an antipyretic and antiseptic from abroad, that the new observations of Professor Schulz deserve also here a careful and extensive study by medical practitioners. In bringing his observations before the profession here, was it deemed desirable to add from still later literature the opinions of some other observers, who employed the oil or indeed also other active principles of Eucalyptus in their calling; these additions have been made, though under extreme abridgment, in parenthetical notes.

Professor Schulz divides the results of his enquiries and own observations on the Eucalyptus oil into 16 chapters, of these only such are here recapitulated at some length, as are of particular medical interest; from the other chapters only brief notes could find space for the present purposes. His treatise closes with references to the literature on Eucalypts, mainly so far as it bears on chemistry, pathology and therapy, the quotations extending from 1865 to 1880. Dr. Grisard gave a list of publications on Eucalyptus in the *Bulletin de la Société d'Acclimatation*, Paris, 1877; in the sixth decade of the Eucalyptus-Atlas this list has been augmented considerably. It will thus be seen, that the whole medical history of the Eucalyptus oil extends over less than 20 years, although the very similar Cajuput oil (of *Metaleuca Leucadendron*) has been in popular

use through many parts of India for at least some centuries. Rumph, already 200 years ago, wrote of the Cajuput oil as a sudorific and stomachic in use on the Molucces, and notes this remedy especially as administered somewhat after parturition ; he also found the native people there employing the foliage of the Cajuputi-Melaleuca as an insecticide. In legitimate practice the oil has long been recognized as an anti-spasmodic.

Professor Schulz in his first chapter explains that the Eucalyptus Oils, as they appear in commerce, differ considerably ; this is traceable partly to the diversity of the raw material, partly to the mode of distillation, and partly to the age of the oil. He operated with oil distilled from leaves of *Eucalyptus Globulus* obtained from Algeria.

There this tree for forestal and hygienic purposes was introduced and also largely diffused chiefly through the writer of this communication. That oil, however, which on by far the largest scale is exported from Mr. Bosisto's great factory to almost all parts of the world, is derived from the richly yielding *Eucalyptus amygdalina*, first brought under notice by the writer as the cheapest of all Eucalyptus oils. In reference to various oils from different species of Eucalypts, the reports of the International Exhibitions of 1855, 1862, and of subsequent years might be consulted, furthermore, the descriptive Atlas of Eucalypts,

1879-1883, with 100 lithographic plates, in which work also the hygienic action of the Eucalypts on climate is discussed.

Professor Schulz freed the oil from irritating acid and other extraneous products of distillation by shaking it repeatedly with a diluted solution of soda, the separation from which is accelerated by warming ; he moreover exposed the oil for months to the influence of light and atmospheric air, with the effect of its being laden with oxygen, by which means the odour of the oil becomes also much more pleasant.

The second chapter of Dr. Schulz's treatise is devoted to explanations concerning the chemical constitution of the oil of *Eucalyptus Globulus*. As well known, Professor Cloez, of the Paris University, was the first who occupied himself with the investigation of the chemical constituents of the *Eucalyptus* oils [from material sent by the writer ; he thus obtained by fractional distillation Eucalyptol, which as a uniform product would perhaps be the best for medicinal use.] Faust and Homeyer, who seem to have operated with the oil of *Eucalyptus amygdalina*, declared that Cymol was one of the constituents of the oils of Eucalypts, an assertion contradicted by Oppenheim and Pfaff, and now also by Schulz, no cuminic acid being eliminated by the urine ; thus the noxious effect of Cymol on the human system need not be dreaded when Eucalyptus oil is used.

Here it is remarkable to note that Professor Schulz himself took the oil, purified and oxygenized by his method, as much as two scruples in a single dose without inconvenience ; and even when increasing the dose to three scruples (of course diluted) he merely felt depression, but nothing abnormal.

Nevertheless, it should be borne in mind that the oil used by Dr. Schulz becomes much changed from the ordinary oil in commerce ; therefore the latter would not be given in such large doses with impunity. Indeed, I found that even a few drops taken as a dose produce marked effect. Moreover, he observed, after taking the refined and oxygenated oil, that the urine, particularly after warming, assumed the odour of violets, as in sequence of the internal use of oil of turpentine. But neither Dr. Von Schleinitz perceived such a result, nor could I myself trace such an odour when using the raw oil of *Eucalyptus amygdalina* ; hence in future trials it should be recorded with absolute precision from what species the oil, used in any experiments, was derived ; furthermore, it seems also clear that the oil, altered by Professor Schulz's method, has lost some of its, perhaps not altogether unobjectionable, properties. Again the Malice-oil from *Eucalyptus oleosa*, *E. gracilis*, *E. uncinata*, *E. incrassata*, and perhaps some other species recently also entering into commerce, through Mr.

Bosisto's enterprising circumspectness, needs probably to be classed, according to its derivation, for therapeutic and surgical purposes. The Eucalypten, derivable from distillation of Eucalyptol over Phosphoric anhydride, seems not yet to have entered the realm of medicine. In 1861 already the oils of 12 species of Eucalyptus were, on the writer's suggestion, examined here with reference to some of their physical properties, by Mr. J. W. Osborne, the inventor of photolithography.

The third chapter of Professor Schulz's work comprehends results of the action of eucalyptus oil in processes of fermentation and putridity. The study of the antiseptic properties of the eucalyptol as well as of the ordinary eucalyptus oil has been carried on with particular care by Siegen and Mees.*—Gimbert** had already remarked before, that oil of eucalyptus injected into the veins of rabbits prevented putrid decomposition, and that the cadaver of animals thus treated became mummified. Siegen found that one part of the eucalyptol in 3800 parts of water† was sufficient to retard the decay of boiled albumen, in very favourable contrast with the value of quinine in that dilution. Merely one half per cent. of eucalyptol with addition of a little acacia gum mixed with water, kept raw meat from

* See their inaugural dissertations, Groningen and Bonn, 1873.

** L'enc. Globulus, en agriculture, hygiène et médecine, 1870.

† (No more being dissolved without other admixtures.)

decay, the muscular fibres, after 20 days, not becoming dissolved, while in a one half per cent. quinine solution it became putrid in four days. (Some similar results were obtained in the writer's own laboratory as long ago as 1866, in comparison to the action of carbolic acid, but remained unpublished.) Dr. Schmid found meat, immersed for a year in undiluted eucalyptus oil, to become almost horny, probably from coagulation of the muscular protoplasm.

Siegen observed that one part of eucalyptol was sufficient to keep 300 parts of blood for 10 days from putrefaction, while in the same time unmixed blood completely decomposed. Solutions of tannin and tartaric acid, to which eucalyptol was added, remained perfectly clear, whereas otherwise they became mouldy. Mees also demonstrated the highly antiseptic power of eucalyptol long ago, but found for his experiments stronger proportions needful than Siegen and Binz.

L. Buchholtz* ascertained that one part of eucalyptol in 666 parts of fluids was sufficient to prevent the development of bacteria, whereas of quinine and carbolic acid, one part in 200 was needed for the same purpose. So also Schulz found that one part of refined eucalyptus oil added to 10,000 parts of water, preserved fresh fibrin for 10 days from development of bacteria,

* Archiv für exper. Pathol. und Pharmakol. 1875.

while the latter largely appeared in fibrin immersed in a solution of the same strength of carbolic acid. Water containing only one per cent. of refined eucalyptus oil in a closed glass kept fibrin free from bacteria for fully a year (and this effect would probably be perpetual).

Both Siegen and Mees have also shewn long ago that alcoholic fermentation is by eucalyptus oil or eucalyptol, more strongly hindered than by quinine. We have therefore in the eucalyptus oil a remedy calculated to act in a high degree antiseptic and antizymotic.

[Also Mr. Th. Taylor† experimented on preserving albuminous compounds in water but slightly eucalyptized, such water proving fatal to bacteria and other micro-organisms; furthermore, like Gimbert, he demonstrated that the oil injected into veins or arteries would preserve cadavers from putridity. Stagnant water, into which many eucalyptus leaves have fallen, is found to cause no fever, and to prevent putrid fermentation. Mrs. Dr. Lewellin informed the writer that, in macerating eucalyptus leaves for skeletonizing in artistic work, such leaves, unlike almost all other foliage, do not cause any unpleasant odor during the process of decomposition.]

The influence of eucalyptus oil on the elements of the blood forms the subject of the 4th chapter

† Report of the Department of Agriculture of Washington, 1876.

in Schulz's work. He found that blood treated with a little eucalyptus oil becomes quite dark and coagulates, as is the case with oil of turpentine. Schlaeger* noticed that the blood of animals treated with eucalyptus oil shewed hardly any difference in color, whether venous or arterial. By the great tendency of this oil to attract oxygen it must be clear that its presence deprives the red corpuscles of the means to re-absorb oxygen.

Mees, and subsequently Binz, have shewn that an addition of one part eucalyptus oil to fifteen hundred parts of blood annihilates after fifteen minutes the contractility of the white corpuscles, while the same effect takes place at once with an addition of one in 1,000. In this respect the action is the same as with quinine : warmth does not restore the vitality of the blood-cells.

The behaviour of the spleen under the influence of eucalyptus comes under consideration in the fifth chapter. The observation of the effect produced by quinine in reducing the volume of the spleen induced Mosler to search for a parallelism in this respect with eucalyptus, though not the oil. This anticipation was completely verified. In experimenting with dogs the hypodermic injection of 150 grains of extract of eucalyptus leaves free of alcohol was applied. After two injections, and in the space of five hours, the

* Inaugural dissertation, Goettingen, 1874.

spleen had evidently decreased in size ; its consistence had become more firm, and its surface dark-red and smooth. In other experiments the surface of the spleen had become granulated, assumed a steel-coloured appearance, and the margin had become warty. Similar effects were otherwise in numerous experiments by Mosler only observed under the influence of electricity and the use of quinine. On auscultation the peculiar sound was heard which occurs in the chill stage of intermittent fever and typhus recurrens.

In the sixth chapter Dr. Schulz treats the effect of eucalyptus oil on the heart, the circulation, and respiration. Schlaeger has shewn by numerous experiments what reducing effect on the action of the heart and on the circulation of the blood is effected through the oil of eucalypts. This applies not merely to man and mammals, as proved already by Gimbert and also by Siegen, but likewise on the lower vertebrata. Schlaeger noticed in experiments on frogs that after subcutaneous injection of eucalyptus oil the palpitation decreased in eight hours from 48 in a minute to 6, and ceased soon subsequently ; the respiration was lessened correspondingly. Schulz in a similar experiment observed that the respiration came already to a standstill, while the heart was beating yet 28 in a minute ; nor did the respiration return. Both impairments would augment

the carbonic acid in the blood and diminish its oxygenation owing to the depressing effect of the oil on the system, and the withdrawal of oxygen.

The action of the eucalyptus oil on the nervous system is discussed in the seventh part of the essay. Like many other volatile oils, particularly that of turpentine, so also the eucalyptus oil exercises a paralysing effect on the spinal column. The brain is brought into a less active state, followed by mental indifference ; even the jactation observed as the effect of large doses of the oil is merely to be regarded as the expression of discomfort. Spasmodic effects are not caused by this remedy. [Indeed, this oil, like that of cajuput, must be regarded as an anti-spasmodic when administered in moderate doses.] Small mammals become paralysed from the mere inhalation of the oil according to Gimbert. For shewing to what extent the reflex irritability can be reduced by eucalyptol and eucalyptus oil, Grisar* and subsequently Schulz counteracted with it the effect of brucin : thus, a rabbit, which received first a subcutaneous injection of eucalyptus oil and an hour afterwards one of brucin had only slight spasms, from which it recovered in the course of the day without impairment of the respiration during all the time ; while another rabbit to which the same quantity of brucin was subcutaneously administered died from tetanic

* Inaugural dissertation, Bonn, 1873,

spasms. Inasmuch as the eucalyptol is not so quickly absorbed as the brucin solution, it becomes necessary to allow some time for the action of the former before the latter is administered.

The behaviour of lower animals under the influence of eucalyptus oil forms the theme of the eighth chapter. Among the number of experiments recorded by Professor Schulz are also some instituted on paramecia, to which no nervous system can be ascribed. Nevertheless, they show in a striking manner how the oil acts first irritatingly on the minutest and simplest of organisms, but how also in them the final effect is a general paralysis. In the more highly developed animals we see, however, the action of this oil the more strongly expressed, as their nervous system is more highly developed. In avertebrate animals two stages are observed under the action of eucalyptus oil—that of irritation and that of paralysis; but whether the increased vivacity arises from central action or is merely the sequence of the external application remains to be made out. In fishes a well-marked stage of narcosis has been observed while experimented on between the irritation and the paralysis; but in amphibia this intermediate stadium is not so well expressed, and it does not seem to occur in mammals.

The eucalypts exercise some effect on various insect pests, and likewise entozoa. Siegen noticed

vermifugal properties in eucalyptus oil, as shewn by driving off ascarides. Vidan* also reports the efficacy of this remedy against oxyuris vermicularis, after the ineffectual use of other anthelmintics, the form of application having been 50-60 drops of eucalyptus oil in an enema for a few successive evenings. Schulz confirms the value of the oil in this respect, brought under his cognizance unexpectedly as a collateral effect on patients otherwise under treatment with eucalyptus oil. But Bérengar-Férand† could not produce good results with the oil against taenia. Rabbits, to which pork containing trichinia spiralis was given, were subjected to a daily subcutaneous administration of $\frac{1}{4}$ drachm of eucalyptus oil, but although the animals became pervaded by the odor of the oil, yet the numerously developed trichinae passed from the intestines on to the museular structure in due course unhurt, although when exposed to the mere spontaneous vapour of eucalyptus oil, they perished like the parameciae. Leeches, placed in water, to which only one-thousandth part of eucalyptus oil was mixed, remained unaffected; but when a small vessel with water, containing leeches, was much exposed to evaporation of eucalyptus oil, the animals coiled in contraction, gave off some blood, entered from time to time

* Journal de thérapeutique, 1875.

† Bulletin gén. de thérapeut, 1880.

into vivid motion, and then gradually became motionless; after $1\frac{1}{2}$ hours the creatures were rigid, and they died in four hours. A crawfish (*astacus fluviatilis*) placed in water containing five parts of oil of eucalyptus in 1000 parts, shewed first some violent motion; after an hour the respiration was slower, though the animal was moving its tail vehemently, the eyes withdrew but slowly on touch, and the creature soon turned on its back, became motionless, and died in five hours; another specimen expired in half a day when placed under a bell glass, to the summit of which cotton-wool sprinkled with eucalyptus oil was fixed; a third specimen perished after 13 minutes from the injection of one drop of the oil behind the thorax-plate. The neuropterous perla *microcephala*, after at first becoming excited, dropped off in an hour motionless, through the mere inhalation of the spontaneous vapour of eucalyptus oil. Cockroaches (*blatta orientalis*), when similarly exposed to air pervaded by eucalyptus oil, fell after increased prior agitation in half an hour on their back, and became torpid in $1\frac{1}{2}$ hours. Humble bees (*bombus lapidarius*) under similar circumstances turned motionless in three quarters of an hour. Flies (*musca domestica*, *M. vomitoria*, &c.), exposed to eucalyptus odor, died in about half an hour after previously violently flying about. Slugs (*limax agrestis*), thus exposed, died almost as quickly, after prior

increased excitement, and much secretion of mucus. Among fishes, large specimens of the leuciscus dabula of the carp tribe, when placed in big vessels filled with water containing $\frac{3}{4}$ per cent. of eucalyptus oil, fell aside already in two minutes, under symptoms of dyspnœa, and died in five minutes; in water mixed with only $\frac{1}{4}$ per cent. after first violently moving about, they dropped aside in $1\frac{1}{2}$ minutes with much working of the gills, then became paralysed, and died in 20 minutes. The dyspnœa symptoms are explained by the withdrawal of the oxygen of such air, as is contained in water, through the widely distributed particles of the oil.

The ninth chapter of Dr. Schulz's essay refers to the internal and external action of eucalyptus oil on man. Professor Gimbert, who first experimented on the physiologic effect of the eucalyptol, found already, that 24 drops taken internally produced a pulsation of 80, and a body temperature of 99 deg. F.; the urine assumed a violet odor, much sleepiness was experienced after five hours; subsequently 8 to 10 drops of the oil taken daily caused no ill effect of any kind. 80 drops administered in two doses within half an hour produced heat of the fauces, warmth in the stomachic region, also eructation, cephalalgia, and then calm sleep. Siegen took nearly a drachm of eucalyptol within five hours, divided into five doses; the effect of this was drowsiness,

with a feeling of tremulency, and considerable depression of the system, but no impairment of the appetite, no particular alteration of the diuresis, beyond odor of eucalyptus. The cutaneous exhalations were more of the odor of trimethylamin. In a second experiment, $1\frac{1}{4}$ drachm of eucalyptol were taken within $2\frac{1}{2}$ hours, causing no disturbance in the digestion, but calling forth a general apathy. In the expiratory secretions, eucalyptol was perceptible for 14 hours, and the urine shewed the presence of the oil for fully 40 hours. Professor Schulz took for a whole month, every morning, 20 drops of eucalyptus oil (best refined) mixed with some milk before breakfast ; as in the operation of oil of turpentine, eructation set in for some days, but ceased afterwards. The urine, when warmed, gave off violet odor, but shewed no albumen ; exhalations of eucalyptus odor were perceptible, but no disturbance in the digestion ; the appetite remained good ; the evacuations continued normal ; no polyuria occurred. Large doses, from 2 to $2\frac{1}{2}$ drachms, taken singly did not affect, hurtfully, the digestion, but a feeling of lassitude and some slight nausea set in, passing, however, in half a day. Experiments were made by Professor Schulz, both with the raw and with the refined oil of eucalyptus, to test their respective effect as an external application. The burning sensation caused by one day's application of the raw oil of

eucalyptus globulus, under exclusion of the atmospheric air, was much like that produced by a sinapism; the skin had become diffusely reddened with simultaneous development of numerous pustules filled with yellowish serum. These appearances diminished slowly, and even after seventeen days, vestiges of the application could be observed in cutaneous exfoliation; the urine emitted, after two days, still an odor of violets. On application of the purified oil of eucalyptus globulus externally, the smell arising was much less intense than from the raw oil, the burning sensation on the skin was much less experienced; but miliary pustules, sudamen-like, appeared also. Two weeks after these experiments arose on the chest a reddish exanthema, which spread to the back and loins, and developed copious pustules, comparable to those of acne; but this eruption was not accompanied by itching, the pustules were grouped orbicularly, and in this manner followed each other. Notwithstanding the use of tepid baths, this complex of appearances lasted for four weeks, and terminated in decrease of rubescence, exsiccation of the pustules, and desquamation of the cutis.

The tenth part of the essay refers to the secretion of the eucalyptus oil through the intestines and kidneys. Eucalyptus oil is able to maintain itself for some time undecomposed in the human constitution. In the expiratory air the odor of

the oil can still be perceived two or three days after a dose of it has been taken, also the fæces may give off the odor of eucalyptus for some time. No irritation is produced by the oil on the organs of digestion, a fact remarkable in contrast with the action of oil of turpentine. In reference to the effect of eucalyptus oil on the kidneys, it may be repeated that the urine assumes a violet odor after a large dose of the oil even for some days. The same effect is also produced by inhalation or infriktion of the oil, but secretion of unaltered oil, if any, with the urine is evidently small. Important is the observation that the kidneys themselves are not abnormally irritated by the passing of the oil. Sternberg affirms that albuminuria, if at all developed, shews itself not so readily after the inhalation of eucalyptus oil as after the inhaling of oil of turpentine.

The temperature of the human and animal body under the influence of eucalyptus oil is the topic of the eleventh chapter. Gimbert was the first to shew that the internal use of eucalyptus oil decreases the temperature of the human body. Siegen found that 100 drops of eucalyptol taken in the course of an afternoon were able to reduce the normal temperature nearly or fully 2° F. Purified eucalyptus oil administered to rabbits by Schulz lessened also the temperature of these animals in a marked manner. Professor Siegen furthermore found the reduction of the ordinary

body temperature from subcutaneous injection of eucalyptus oil also to be about 2° F.

The action of eucalyptus oil in pyaemia and sepsis is discussed in the twelfth chapter. In diseases of the human organism, when produced by infection, the eucalyptus oil has proved its efficacy, though its action is circumscribed, as is the case more or less with all antiseptics. Siegen was one of the first who experimented with the eucalyptus oil for demonstrating its antipyretic action. [But the discovery of the value of eucalyptus foliage as affording remedies in fevers arose with Tristany and Trixidor in 1865.] Schulz made numerous comparative experiments on rabbits, brought into a fever state through the injection of putrid liquids from meat or decaying hay, and he was able, through counter-injection of the oil of eucalyptus, to reduce the temperature sometimes fully 4° F. in three hours. The application required from time to time to be repeated.

In the 13th part, Schulz propounds his theory of the action of the eucalyptus oil, the following being the outline :—All terpens and their compositions possess in a high degree the ability to attract oxygen and to form ozone, which again is readily given off on substances fit to undergo a higher stage of oxydation : thus, on contact, any living cellules become more speedily and more strongly oxygenated. The oil, however, takes up again a new supply of oxygen from its surround-

ings, but becomes in this process also partly or gradually converted into a resinous state and consequently inert. The oil circulates through the organism in the minutest of atoms, its action therefore being rapid and extensive.

On the general therapeutic importance of the eucalyptus oil is dwelt in the 14th part. From chemical observations it has become patent that the eucalyptus oil can advantageously be drawn into use not only against infectious fevers, but also for the dressing of wounds or sores, even of malignant character. Furthermore, the effect of the oil in diminishing the reflex action is to be taken into consideration, as thereby irritation is lessened. The anti-neuralgic effect of the oil is also worthy of attention, especially when circumscribed neuralgias are to be subdued by the simple application of the oil to the epidermis, it being so well able to penetrate the cutaneous layers. In dressing wounds it has been noted that the secretion becomes diminished, that the favourable change of the exudation promotes the tendency of healing, dependent on the closing process through new granulation under the influence of the oxygen evolving from the oil.

The value of Eucalyptus Oil in the treatment of wounds, forms the fifteenth part of the essay:—

Gimbert, already, 1870, in his treatise "*L'Eucalyptus Globulus, son importance en agriculture, en hygiène, et en médecine,*" spoke of the

eligibility of eucalyptus oil in surgical treatment. In his own clinic he applied in a case of contused wound of the back of the foot, simply eucalyptus leaves fixed by bandage, and although the case presented a bad aspect, and its surroundings were cedematous, granulation had commenced in 24 hours under the development of inodorous pus, and perfect healing took place in eight days. (In this way eucalyptus leaves have long been a popular remedy in Australia, as well as the solution of eucalyptus-kino.) In treating a gunshot wound of the thigh of two months' standing, Gimbert applied contused fresh eucalyptus leaves; and although the ulceration had been unsuccessfully treated with carbolic acid, and caustics under pressure bandage, and although the periosteum had become infiltrated and discolored, and the bone was already affected with pain, yet the case improved in 24 hours; after the contused eucalyptus leaves were closely applied by bandage, the pus became free of smell, healthy granulation set in, and the case progressed completely to recovery in two and a half months under this simple treatment.

A gangrenous wound of the leg of a man seventy years of age, with diffuse, secondary cedema, and foetid exhalation, yielded also to the treatment with crushed eucalyptus leaves, and the wound came, after three months, to a close. Fouqué found in defects of the cutis after variola, that

rapid cicatrisation was brought about by the application of fresh contused eucalyptus leaves.

Gubler* recommended the use of eucalyptol against phagedænic, and also against gangrenous ulcers, to initiate a healthy granulation.

Cochet† applied either the alcoholic tincture of eucalyptus leaves, or their aqueous destillate in the following cases:—Gunshot wound, necrosis tibiæ, carcinoma mammæ et vaginæ; the general results were, according to the cases, healthy cicatrisation, or at all events, cessation of fetidity.

Marcano‡ succeeded in subduing far progressed gangrene of both feet, through the long-continued application of eucalyptus tincture.

Labbee§ corroborated generally the statements of Gubler, Gimbert and others, using, however, a one per cent. solution of eucalyptus oil in spirits.

Aquilar|| used a strong infusion of eucalyptus leaves for saturating bandages, effecting thus decrease of pus, and disappearance of erysipelas; chronic sores of the legs (after previous washing out) he covered densely with the dry powder of eucalyptus leaves.

Siegen¶ records more recently the following cases:—

1. A child, three years of age, treated for caseous lymphatic glands in the right cervical region;

* Bulletin gén. de Thérapéut., 1871; † 1872.

† Bulletin gén. de Thérapéut., 1873.

§ Journ. de Thérapéut., 1875.

|| Anales del ciroulo medico Argentino, 1879.

¶ Deutschö med. Wochenschrift, 1880, 1881.

the instruments were disinfected, and the space of operation washed with a two per cent. aqueous eucalyptus solution; after the emptying of the glands, a gauze bandage moistened with eucalyptus oil, was applied under cover of gutta-percha paper; the blood secreting under the bandage was, after two days, still undecomposed, the scanty pus remained odorless, and the rather ample wound healed in eight days, without causing eczema, to which the patient was otherwise subject.

2. In treating genu valgum of a child of four years: cuneiform excision of the tibia under thymol spray; bandage with eucalyptus oil; no fever; not a drop of pus; healing of the wound per primam intentionem, so that ten days after the operation, only a line of granulation was extant, corresponding to the length of the removed cutis.

3. Elbow resection in a child twenty months old, under thymol spray; washing out of the wound with an eight per cent. lotion of chloride of zinc; bandage with thymol gauze; odor, after the second application, very foetid and profuse; after rinsing with a one per cent. solution of hypermanganate of potassium, application of wet eucalyptus bandage; after the first application, no more bad-smelling pus; complete and rapid healing.

4. Cleavage of a periarticular abscess of the knee; wet eucalyptus bandage; progress very favorable; for preparing the gauze bandage, Professor Siegen uses three-parts eucalyptus oil, dis-

solved in fifteen-parts alcohol, and an admixture of one hundred and fifteen parts water; a bandage with liquid, containing two per cent eucalyptus oil, requires removal after three days; one with five per cent. oil, can be left unchanged for four or five days; the oil, however, should be purified; no eezema caused, such as is apt to arise from thymol.

5. Exsudation from the left pleura; removal of a quart of putrid pus by aspiration; subsequent paracentesis; the washing out of the pleural cavity was performed with water containing $\frac{1}{10}$ per cent. of thymol; the wound, after placing the canula, was dressed with wet eucalyptus bandage; notwithstanding the lethal termination of the case, the wound had, throughout, a fresh appearance, granulated well on the third day, and the secretion was without smell.

6. Burning of the right hand through explosion of a petroleum lamp. The epidermis from the joint of the hand was lifted both on the volar and palmar side, carrying with it the nails; the nail-phalauX of the middle finger was half carbonized. Under daily application of eucalyptus bandage, the healing process went on favourably in three weeks, except a small place on the third phalauX of the middle finger, where a piece of bone exfoliated; cicatrization everywhere smooth. The patient preserved a useful hand.

7. Wound after the extirpation of a lipoma as

large as a man's head; the edges could not be brought together from ulceration; wet eucalyptus bandage; closing up of the wound in three weeks, except a narrow line of granulation.

8. Abscess on the right side of the thorax, originating from caries of the fourth rib. Opening by incision; excochliation of the carious place; wet eucalyptus bandage; healing in two weeks.

9. Abscess on the right foot from superficial caries of the tibia; incision; excochliation of the carious bone. Eucalyptus bandage; healing in four weeks.

10. Phlegmone of the right foot, brought on through piercing by a nail; two parallel incisions into the back of the foot forward to the tarsal joint; drainage; eucalyptus bandage; healing in two weeks.

In the treatment of greater operations, thus performed by Siegen, the eucalyptus oil was always used on compresses, although during the operation itself the spray of carbolic acid or thymol came into play. To show, however, that the eucalyptus oil alone can effect, whatever is expected from an antiseptic, the following case is specially related :—

11. Hygroma cysticum congenitum axillare of the size of a middling apple in a child of only 10 weeks old. Cutting of the wall of the cyst in its whole length; treatment with a lotion con-

taining 2 per cent. of eucalyptus oil; drainage; gauze bandage; healing without pus, with one change of bandage only in six days.

Bassini's observations in the Parma hospital are far less favourable for the antiseptic application of eucalyptus oil; but he used only $1\frac{1}{4}$ parts of raw oil in 1000 parts water, and varied the strength from 5 to 50 per cent. on paraffin gauze. As a local disinfectant, chloride of zinc was used in an 8 per cent. solution.

Professor Busch,* in Bonn, employed also in his clinic the eucalyptus oil as antisepticum, on which occasions it was found out that occlusive bandages saturated with eucalyptus oil caused the irritating effect alluded to in the early part of this article. In the following cases purified undiluted eucalyptus oil was used :—

1. Excision of a keloid behind the ear. Application of eucalyptus oil with a brush; abundant granulation, with but little pus, in a very short time.

2. Tubercular granulating inflammation of tendon-sheath on the back of the right foot. Merely brushing with eucalyptus oil. Success as in case 1.

3. Periproctic abscesses. After incision daily application of a compress moistened with eucalyptus oil; abundant granulation with slight bleeding; healing.

* Berlin, Klin. Wochenschrift, 1880.

4. Ulceration of the first and the second toes. Regular brushing with eucalyptus oil; healing.

5. Excision of a carcinoma from the nose; rhinoplastic. The bare space of the brow brushed with eucalyptus oil, producing rich granulation, and but little pus. (Two cases.)

6. Carcinoma mammæ. After amputation a remaining bare place; its granulation, after removal of Lister's bandage, became accelerated by brushing with eucalyptus oil. (Three cases.)

7. Abscess at the posterior wall of the rectum. After incision successful granulation from eucalyptus oil applied by brush.

8. Syphilitic ulcer in the tibial region with very fetid odor. Effectual treatment with eucalyptus oil by the brush.

9. Ulcus cruris dextri; diameter each way about 6 inches. Daily brushing with eucalyptus oil; compresses moistened with eucalyptus oil at night, producing a quicker cicatrization than that obtainable by any other means; but complete healing only in two months. (Several cases, some with most extensive sores.)

10. Large ulcer on the malleolus internus. Healed in four weeks under the application of eucalyptus oil. Irrespective of these cases the pure oil was used in various minor operations, such as the extirpation of telangiectasia in a little child, the application always proving painless.

Cases in Professor Busch's practice when an aqueous lotion, containing 2 or 3 per cent. of eucalyptus oil, was employed:—

1. Carcinoma nasi. To obviate the factor the above lotion was introduced on lint, and proved so far very effectual.

2. Hydrocele; radical operation. The wound was rinsed with the lotion; quite as good an effect as with any other antiseptic.

3. Abscess on the right thigh from cyphosis. Incision in two places; drainage. Notwithstanding the application of the Listerian bandage, putrid decomposition of the copious secretion took place, and the temperature rose enormously. This was overcome by washing several times a day with water eucalyptized as above indicated. The factor ceased very soon; the fever heat sank also in a few days, and the patient could leave cured after several weeks.

4. Carcinoma ani et recti; total extirpation. The wound was at once covered with compresses wetted with the eucalyptus lotion, and twice a day it was irrigated with the same liquid. No evil smell; good granulation; no fever; the patient sent away as cured in three weeks. A very similar case also ended exceedingly well under the same treatment.

5. Cystic swelling of the lower jaw bone; extirpation with remnant of the inner bone wall; drainage; rinsing with eucalyptus lotion; no

decomposition of the secreting fluid in contrast with the dreadful odor arising usually under other modes of treatment.

6. A paralytic patient under Dr. Schulz's care, suffering from extensive herpes in the region of the left glutæus, and also from incontinentia urinæ, had a large place bare from abraded cutis dressed with carbolic acid ointment and with lint slightly carbolized, but with good result. Subsequently the wound was brushed with pure eucalyptus oil morning and evening, and left without any covering. Soon the sore assumed a better colour; the granulation set in and went on well, and the healing process was quite completed within a few weeks. Dr. Schulz sums up:—

1. Eucalyptus oil unites with its antiseptic influence also a power to promote granulation, which latter effect is to be ascribed much to the mild stimulating action of the oil on wounds.

2. In consequence of the action of the eucalyptus oil on the contractile particles of the blood, it is found that the formation of pus is greatly decreased or sometimes altogether ceased.

3. The eucalyptus oil cannot be used exactly in the same manner as carbolic acid with the listerian bandage under exclusion of air, inasmuch as preventing the evaporation of the oil leads to an increased temperature under the bandage, whereby the irritating influence of the oil is

unduly exercised. [But an adequately diluted solution can doubtless be applied under impervious coverings also.]

4. The eucalyptus oil acts highly beneficially on wounds, whether—according to requirement—it is applied directly, then even causing no pain, or whether mixed with much water, to moisten compresses and bandages, or to irrigate the cavities of wounds.

5. Pure eucalyptus oil, in comparison with carbolic acid, is not poisonous, and can therefore be administered even in large doses internally.

6. Eucalyptus oil can therefore be employed with impunity, when any risk is foreseen in the use of carbolic acid; thus in the treatment of youthful individuals and of exceedingly debilitated patients, also in cases where large spaces of wounds lead to great resorption from without; while also an excessive quantity of the administered oil can never be followed by such serious consequences, as in the case of carbolic acid.

Lately, also, Dr. A.W. Mayo Robson, of Leeds, to obviate some of the disadvantages of carbolic acid spray, has used, in various surgical operations, currents of air wafting over eucalyptol or cajuput oil or oil of peppermint for antiseptic effects, preferring the eucalyptol to terebene and the above-mentioned oils; the wounds run all an aseptic course, but for dressing carbolic acid or

salicylic acid was employed. Dr. Robson's mode of substituting vapour of eucalyptol for carbolic acid spray was adopted also by Dr. T. Prigdin Teale, Dr. Clouston, and Dr. Spencer Wells with satisfactory results. (*British Medical Journal*, September, 1882.) Dr. Floyd, of Sedgwick, Kansas, has given his experiences with eucalyptus dressing, finding none equal to it in lacerated wounds. (*Detroit Therap. Gazette*, 1881). Indeed, Professor Lister himself countenances the use of eucalyptol, when dangers are expected from treatment with carbolic acid. (*Lancet*, 1881.) Dr. Samuel Sloan directs attention to the advantages of the oil of eucalyptus as an antiseptic in obstetric practice, as this remedy is not poisonous, as in its proper dilution it is not irritating, as it does not coagulate the lochia, as its odor is not unpleasant, and as it acts as an uterine stimulant. He recommends this oil also in the forming of pessaries, and in a solitary case of pyæmia arising after delivery he resorted successfully to repeated hypodermic injections of eucalyptus oil diluted with two to four times its quantity of olive oil. (*Lancet*, September, 1882.)

Dr. G. von Schleinitz, in Arnsberg, experimented clinically also with eucalyptus oil, purified by Schulz's process. Neither dyspepsia nor cephalalgia, nor albuminuria arose from the use of the oil. In phthisis and typhus abdominalis reduction of the pulse was observable and quick

diminishing of the secretions of the mucous membranes, especially after the inhalation of vapor of eucalyptus oil in bronchorrhœa, all this accompanied by a feeling of increasing comfort of the patients. Dr. von Schleinitz also confirms the observations in reference to the decrease of secretion from wounds after treatment with eucalyptus oil, and likewise in respect to the copiousness of granulation. He quotes the following cases:—

1. Abscess after caries of the sternum.—Incision; injection with water containing 1 per cent. eucalyptus oil; gauze bandage with 5 per cent. lotion; perfect healing in 10 days.

2. Scald of the leg.—Gauze bandage with 5 per cent. eucalyptus lotion; hardly any pus; strong granulation; healing in 16 days.

3. Abscess on the neck.—Incision; injection of water with 5 per cent. eucalyptus oil; bandage with eucalyptus lotion of the same strength; secretion reduced to a minimum; healing in 11 days.

4. Extensive burning of the leg through a solution of caustic potash.—Dressing with a bandage moistened with 5 per cent. lotion of eucalyptus oil; smooth healing in 6 weeks.

5. Ulcus cruris chronicum of large dimension.—Brushed for three weeks with eucalyptus lotion of 5 per cent.; afterwards application of pure

eucalyptus oil every four days; dressing, merely lint; healing in 8 weeks.

6. Carcinoma vaginæ.—Brushing at first with eucalyptus lotion of 10 per cent., then with pure oil; pain only slight; action corroding and disinfecting.

Very satisfactory results were obtained by this physician as well in bronchial catarrh as in developed phthisis, to diminish cough and secretion, and to afford night's rest. The oil is either inhaled in a dilution, varying, according to circumstances, from 1 to 5 per cent. every three hours, or in suitable cases the oil is taken internally, first to the extent of $\frac{1}{4}$ to $\frac{3}{4}$ drachms daily, mixed with 180 parts of water, and distributed into two hours' doses. For inhalation, also, Hausmann's respirator can be employed, 10 to 20 drops of the oil being put on the cotton wool. (*Berliner Klinische Wochenschrift*, Aug., 1882.) That the fresh bruised leaves can with advantage be employed for dressing wounds, to prevent or subdue septic inflammation, was mentioned also in an extensive article on Eucalyptus Globulus in the 6th decade of the *Atlas* in 1880, though known to many of our colonists long before.

With the 16th chapter on the internal use of eucalyptus oil the work closes.

The principal domain of the eucalyptus oil in the field of therapy is that of the intermittent fever, in the treatment of which disease it has

acted with surprising power. Lorinser* mentioned that in 11 cases of ague, attended to in vain with quinine, 9 recovered through the administration of eucalyptus leaves. Keller† reports that of 432 cases under his observation and treated with Lorinser's tincture, 310 became cured, and of these 202, after the first dose, without relapse, and 108 after repeated paroxysms. Of 118 patients, who derived no benefit from quinine, 91 recovered after the use of eucalyptus tincture. Many other cases of similar results are mentioned in pathological literature, although not so numerously illustrated.

Professor Rosenstein, under whose and Professor Huizinga's surveillance the splendid observations of Dr. Mees were carried on, mentioned to Professor Schulz a case, occurring in the clinic of Leyden, of a quotidian fever, which had resisted to quinine as well as to arsenic. Though both these remedies had produced a lowering of the temperature, they did not prevent the return of the paroxysms, whereas the administration of the alcoholic tincture of eucalyptus leaves led to an enduring recovery, and all abnormal increase of temperature ceased at once. Rosenstein gives the tincture made in proportion of 1 part leaves to 8 parts alcohol, and of this the daily doses amount to about one and a half ozs. But in

* Wiener med. Wochenschrift, 1868, 1869, 1872.

† Berliner Klinische Wochenschrift, 1872.

recent cases of ague the action of quinine far surpasses that of eucalyptus. In chronic cases, and whenever quinine proved powerless, Rosenstein saw very favourable results from the eucalyptus.

Not less powerful than in malarian fever has the eucalyptus oil shown itself effective, according to the observations of, chiefly, French physicians, against febris intermittens larvata, expressed in some periodically returning neuralgias, especially those of the terminations of the quintus and those of the gastric nerves.

That also chronic tumours of the spleen, particularly those originating from miasmatic influences, are likely to yield to the action of eucalyptus oil is foreshadowed by the experiments of Mosler.

Mosengeil saw in traumatic fever, and Zuntz also in acute rheumatism of the joints, the temperature fall after the administration of eucalyptol, as recorded by Siegen. Twelve cases of typhus abdominalis, under the care of Dietsch,* were treated for lessening the temperature with eucalyptus oil. Dietrich used the tincture in febris gastrica. Its action must also in these cases, be attributed to the anti-fermentive power of the medicine, exercised readily in the stomach and intestines without any irritating effect. Dr.

Inaugural Dissertation, München, 1874.

Schulz places on record, from his own practice, the good done by eucalyptus oil to phthisical patients to subdue the very weakening vomiting, to which such sufferers are sometimes subject, especially as the appetite increases, under this treatment.

Bell* has successfully treated some affections of the colon with eucalyptus tincture, and used eucalyptus oil in a case of *ulcus ventriculi*.

Dobell† administered eucalyptus tincture in hay fever.

Mosler saw advantage in using inhalations of eucalyptus vapour in diphtheria, and while the oil is sure to exercise a destructive effect on the diphtheritis fungus, it has the advantage over many other remedies of being innocuous—a superiority never too highly to be estimated in the treatment of children. The spray of eucalyptus oil would have also a more enduring effect on account of the trifling solubility of the oil, while its slightly stimulating action would accelerate the healing of the impaired mucous membrane.

The observations of Mees‡ and Binz§ have shown that the egress of the white blood corpuscles cannot take place under local influence of eucalyptus oil. Thus for catarrhal affections of

* London Med. Record, 1878.

† London Pharm. Journal, 1874.

‡ Deutsches Archiv für Klin. Medicin, 1874.

§ Archiv. für patol. Anat. und Physiol, 1878.

the mucous membranes a remedy is found. A fresh nasal catarrh can be cut short by inhalation of the vapour of this oil; but instances are likewise known of the more remote portions of the trachea and bronchial having been reached by vapour of eucalyptus oil. Moreover, we know that the oil, taken internally, is partly eliminated by the lungs; hence we may expect also benefit from it in pulmonary diseases, irrespective of the well-established fact of this remedy reducing the reflex action. Thus catarrhal asthma and, as Gimbert reports, also whooping cough can be overcome by the eucalyptus inhalations; hence the introduction also of eucalyptus cigarettes (first suggested by Monsieur Ramel.) The diffusion of eucalyptus vapour, through whole rooms by means of oil and occasional addition of hot water, is easy indeed. Bell observes in reference to inflammation of the respiratory organs: "I have witnessed remarkable benefit after a very brief use of the remedy, evinced by a rapid diminution of the discharge and also by a corresponding improvement in the general condition of the patient."

In five cases of incipient or threatened gangrene of the lungs Bucquoy* gave the tincture of eucalyptus leaves with good effect, after carbolic acid had failed. A similar result is communicated from Ruchle's clinic in Bonn; but in the

* *Lancet*, 1876.

latter instance the oil of eucalyptus leaves was used. The case was a very marked one. After three weeks the patient expectorated a large quantity of sputa of frightful odour, and afterwards this daily to the extent of half a pint. Carbolic acid (1 part in 100) inhaled for two days produced no improvement. One hour after taking 20 drops of eucalyptus oil, internally, the expectoration lost its foetor; thence sleep and appetite improved. After taking, morning and evening, 20 drops of eucalyptus oil for four days, the bad odour again was perceptible in the sputa, but did gradually cease under the effects of daily doses of 60 drops of oil, augmented by inhalations every three hours, and the patient could be discharged in one month as cured. It may yet be remarked what a relief the deodorisation gives as well to the patient as to his attendants. Such success might, perhaps, also have been reached with oil of turpentine, but certainly not without abnormally disturbing the urinary organs.

The elimination of the oil, as shown before, occurs also partly through the kidneys; hence Gimbert noticed that in acute vesical catarrh the use of eucalyptus oil and of powdered eucalyptus leaves rendered the turbid urine clear; the pain during micturition ceased and the fever vanished. Wooster* reports that of 27 cases of catarrh of the bladder, 25 became cured through this remedy,

* *Lancet*, 1872.

and that also in three cases of *incontinentia urinæ* cures through this medicine had occurred in his experience. Diminution of the reflex action, irrespective of the anti-catarthal power of the oil, offers here the physiological explanation. Aron* recommended the tincture or infusion of eucalyptus leaves against blennorrhœa and acute urethritis. Schulz himself combated urethritis of two years' duration by employing twice a day a watery injection containing merely so much eucalyptus oil as would produce an only slightly smarting or burning sensation, the evil being overcome in six weeks.

To supplement these important therapeutic records, as adduced by Professor Schulz, the following more recent cases have been selected:—

Dr. Keller, of Vienna, saw under his treatment of 432 cases of partly simple, partly complicated malarian fever, 310 cured by the use of eucalyptus, 202 getting only a single dose of the tincture, quinine having been given previously in 118 out of the 432 cases. From 1 lb. leaves $2\frac{1}{2}$ quarts of tincture was obtained, the average dose being 2 drachms.

Dr. Talbot, of Ohio, subdued malarian fever of several months' duration, after unsuccessful use of quinine, by eucalyptus tincture. In the same manner he effected cures of remittent fever.

Professor J. E. Braskett, of the Howard's

* Recueil des mém. de médecine militaire, 1873.

University of Washington, reported 16 hospital cases of chronic malarian poisoning, which had resisted all other treatment, but recovered under the use of eucalyptus. (*Detroit Therap. Gazette*, Feb., 1883).

Dr. A. Ladendorf, of Andreasberg, likewise gave the tincture of eucalyptus in fevers, but the doses were 3 to 5 ounces daily, the dicrotic pulse, notwithstanding this large quantity of alcoholic fluid, changing gradually to the normal state. He obtained by this remedy also in diphtheria, irrespective of the lowering of the temperature, a remarkably quick change for the better as regards the local affection. (*Berliner Klinische Wochenschrift*, August, 1879).

Dr. Wooster, of San Francisco, in a report on 129 cases of various diseases, treated exclusively with fluid extract of eucalyptus foliage, gives the following results :—

Remittent fever ...	5 cases, all cured
Intermittent fever...	9 " " "
Typhoid fever ...	9 " " "
Nephritis	4 " 3 "
Diuresis	10 " 7 "
Incontinence of urine	3 " 3 "
Vesical catarrh ...	27 " 25 "
Blennorrhagia ...	13 " 10 "
Dysentery	4 " 3 "
Chronic diarrhœa ...	13 " 9 "
Gonorrhœa	15 " 10 "
Hydrops	6 " 3 "

Whenever the cases did not yield to treatment, the condition of the patient became ameliorated. (*Detroit Therapeutic Gazette*, Feb., 1883.)

Dr. D. E. Smith, of New York, corroborates from 3 years' experience the prompt action of eucalyptus as a febrifuge, especially in cases of simple malarian and remittent type, after failure of the cinchona alkaloids and other remedies, the form of administration being the fluid extract. (*Medical Tribune*, 1883).

Dr. H. A. Foster confirms by independent observations the value of eucalyptus in malarian fever, recent as well as chronic, in catarrhal affections of the air passages, from coryza to bronchitis, in diseases of the alimentary canal, such as ulcers in the stomach and chronic diarrhœa, also in affections of the urinary tract, such as blennorrhœa and cystitis. This observer praises the remedy as particularly available in the last-mentioned disease, and this is borne out by the experiences of Dr. J. C. Roberts, of Pulaski, Tennessee, even chronic cases with hæmaturia being relieved almost immediately.

Dr. Ch. Jas. Fox found the tincture of eucalyptus, in 3 doses, 3 times a day, promptly combating chronic diseases of the stomach and bowels. (*Detroit Therap. Gazette*, 1881.)

Dr. Benj. Bell, by administering the tincture of eucalyptus leaves in the treatment of typhoid fever, noticed the duration of the disease short-

ened, and the tendency to diarrhoea diminished. (*Edinburgh Medic. Journal*, 1881).

Professor J. J. Mulheron, of Detroit, has used eucalyptus tincture in severe cases of cystitis, and effected cures when all ordinary remedies had failed.

Dr. A. J. C. Skene bears likewise testimony to the value of the eucalyptus in cases of similar kind. (*Detroit Therap. Gazette*, Feb., 1883.)

Dr. C. N. Palmer, of New York, used topically the fluid extract of the foliage of eucalyptus globulus in diphtheria for the last 5 years. It destroys all odour, facilitates the detachment of the deposit, and frequently prevents secondary formation. His topic use of the eucalyptus, along with other adequate treatment, covers hitherto over 100 cases positively diphtheritic. It is applied upon a clean swap every two or three hours. (*Detroit Therapeutic Gazette*, August, 1883).

Dr. J. Burney Yeo invented a particular and inexpensive inhaler, which can be applied and carried conveniently, and even be kept during sleep. In this respirator is placed any antiseptic fluid, which may be chosen; and among these he finds eucalyptol well suited, and it is particularly resorted to by him for arresting pulmonary consumption, and nearly always with marked benefit. Even in somewhat advanced cases this procedure allays the cough, lessens

expectoration, and diminishes the fever. He often uses the eucalyptol mixed with equal parts of spirits of chloroform, the dose at a time varying from 5 to 20 drops. (*British Medical Journal*, July, 1882).

Inhalation of eucalyptized spray from a steam atomizer proved a valuable adjunct in the treatment of diphtheria, bronchitis, and phthisis. (*Detroit Therap. Gazette*, Dec., 1881).

Dr. Alexander Buettner, of Melbourne, has also availed himself, for some years of eucalyptus, for inhalations in affections of the respiratory organs, including cases of hydatids of the lungs.

The credit of initiating this therapeutic procedure is due to Professor F. Mosler, of Greifswald, after some suggestions by Waldenburg, and, somewhat later, by Oertel.

Professor Mosler was also the first who advised to place tubs with growing young eucalyptus trees, for disinfecting purposes, into the wards of hospitals. (*Berliner Klinische Wochenschrift*, May, 1879).

Dr. Walcher, of Strassburg, employed the tincture from $2\frac{1}{2}$ to 5 drachms, daily in chronic bronchitis, pulmonary inflammation, croup, and the success was beyond expectation. (*Strassburg Gazette Medicale*, Feb., 1877).

Dr. A. B. Woodward, of Philadelphia, used eucalyptus extensively in scarlatina and in diphtheria, changing malignant, soon, into simple types,

and stopping the putrid smell, so often present, in half a day. (*Detroit Therap. Gazette*, Feb., 1883).

Dr. Padiera, of New York, treated successfully a chronic ulcer of the stomach with the fluid extract of eucalyptus leaves. Unfortunately, the precise mode of the preparation of the various eucalyptus remedies, their exact strength, and the source of the utilized material are not generally recorded. (The "liquid extract" of eucalyptus, as prepared according to the Pharmacopœia of the United States, is a very concentrated alcoholic tincture, containing the soluble principles of about as much in weight of dried leaves as quantity of tincture is obtained).

Among the early authors on the therapeutic value of eucalyptus globulus not alluded to by Professor Schulz are :—Dr. Carlotti, of Ajaccio (with whom, as well as some of the following physicians, the writer corresponded for many years on this important subject); Dr. Tedeschi, also of Corsica; Drs. Leuglet, Raveret-Wattel, and Pepin, of Paris; Dr. Saccharo, of Palermo; Dr. Aberg, in Buenos Ayres; Dr. Pietra Santa, of Algiers; Professor Planchon, of Montpellier.

As the supplemental notes, here offered, are travelling beyond the scope of Professor Schulz's work, in so far as they pertain also to eucalyptus remedies other than the oil, it may be needful to say a few words on the solid chemical principles

contained in eucalyptus leaves, as the latter are extensively in use for tinctures and infusions.

H. Weber determined the solid chemical constituents of the leaves of eucalyptus globulus as :—

1. An acid substance crystallizing in needle-like form.

2. An acid resinous substance of bitter taste and yellow colour.

3. Eucalyptic acid.

4. Eucalyptine, a neutral crystallisable, bitter substance, on which latter the febrifugal virtue of the eucalyptus foliage seems mainly to depend, and which, for precise medical administration, it would be well to isolate. At all events, the antipyretic principle should be further studied from the point of chemistry. (See the writer's English edition of Wittstein's organic constituents of plants, 1878).

Mr. Th. Taylor gave, also, some attention to the chemical contents of eucalyptus leaves. (Report of the Department of Agriculture of Washington, 1876).

The foliage of different eucalypts is, however, as variable in quality and quantity of its solid as of its oily constituents. The contributor of this article thus found that the leaves of encalyptus leucoxydon contain in the fresh state about 5 per cent. of eucalypto-tannin, equal to the large percentage of 10 in the dried leaves. (F. v. M.,



Select plants for industrial culture, American edition, 1883), and indicative of special therapeutic value.

In concluding this contribution towards the Australian literature of the British Medical Association, the writer, in bringing the recent work of an eminent foreign professor of medicine before the Australian profession, entertains a hope that not only thereby the still largely prevailing discredence in the extraordinary medicinal value of the eucalypts will wear away, but that also medical men in this part of the globe, and more particularly those commanding hospital facilities, will aid, by independent local researches, to determine the exact value of each of the various eucalypts, numbering about 120 well-marked species, in medicine and surgery, for which purpose the facilities in the native lands of the eucalypts must necessarily be greater than elsewhere.





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We now call special attention to the following extracts from this Important Medical Work and the very special attention of all our Medical practitioners, druggists and apothecaries, for those who desire to restore their patients, should know the TRUTH here presented, coming as they do, from great medical authorities abroad.

TREATISE ON EUCALYPTUS OIL

Professor Hugo Schulz, of Griefswald, while connected with the University of Bonn, enriched the scientific literature with an important publication, entitled "Das Eucalyptus-Oel, Pharmacologisch und Clinisch dargestellt," 1881, and thus brought together what mainly was known on that subject up to that time, his essay also being replete with original observations, chemical, physiological, and medicinal. Strangely enough, in the very lands of Eucalyptus their medicinal properties, though so useful and safe, have obtained hitherto but very inadequate professional recognition in either medical or surgical. Still, Eucalyptus oil and several valuable Eucalyptus preparations have made their way to some extent as popular or domestic remedies in Australia also. Absence of malaria fevers from most parts of the Australian territory may account to some extent for the very limited use into which the Eucalypti are drawn by legitimate therapy in this part of the globe: But we have now such overwhelming testimony of the special value of the oil as an antipyretic and antiseptic, from abroad, that the new observations of Professor Schulz deserve also here a careful and extensive study by medical practitioners. In bringing his observations before the profession here, it was deemed desirable to add from still later literature the opinions of some other observers, who employed the oil or indeed also other active principles of Eucalyptus in their calling; these additions have been made, though under extreme abridgment in parenthetical notes.

Professor Schulz divides the results of his enquiries and own observations on the Eucalyptus oil into 16 chapters, of these only such are here recapitulated at some length, as are of particular medical interest; from the other chapters only brief notes could find space for the present purposes. His treatise closes with references to the literature on Eucalyptus, mainly so far as it bears on chemistry, pathology and therapy, the quotations extending from 1865 to 1880. Dr. Grisard gave a list of publications on Eucalyptus in the Bulletin de la Societe d'Acclimation, Paris, 1877; in the sixth decade of the Eucalyptus Atlas, this list has been augmented considerably. It will thus be seen, that the whole medical history of the Eucalyptus oil extends over less than 20 years, although the very similar Cajuput oil (of Melaleuca Leucadendron) has been in popular use through many parts of India for at least some centuries. Rumph, already 200 years ago, wrote of the Cajuput oil as a sudorific and stomachic in use on the Molucces, and notes this remedy especially as administered somewhat after parturition; he also found the native people there employing the foliage of the Cajuputi-Melaleuca as an insecticide. In legitimate practice the oil has long been recognized as an anti-spasmodic.

Professor Schulz in his first chapter explains that the Eucalyptus Oils, as they appear in commerce, differ considerably; this is traceable partly to the diversity of the raw material, partly to the mode of distillation, and partly to the age of the oil. He operated with oil distilled from leaves of Eucalyptus

obtained from Algeria.

There this tree for forestal and hygienic purposes was introduced and also largely diffused chiefly through the writer of this communication, Baron Von Mueller.

In references to various oils from different species of Eucalypts, the reports of the International Exhibitions of 1855, 1862,* and of subsequent years might be consulted, furthermore, the descriptive Atlas of Eucalypts, 1879-1883, with 100 lithographic plates in which work also the hygienic action of the Eucalypts is discussed. The great work is in ten volumes by Baron Ferd Von Mueller.

The eucalyptus oil acts highly beneficially on wounds, whether—according to requirement—it is applied directly, then even causing no pain, or whether mixed with much water, to moisten compresses and bandages, or to irrigate the cavities of wounds.

Pure eucalyptus oil, in comparison with carbolic acid, is not poisonous, and can therefore be administered even in large doses internally.

Eucalyptus oil can therefore be employed with impunity, when any risk is foreseen in the use of carbolic acid; thus in the treatment of youthful individuals and of exceedingly debilitated patients, also in cases where large spaces of wounds lead to great resorption from without; while also an excessive quantity of the administered oil can never be followed by such serious consequences, as in the case of carbolic acid.

Dr. G. von Schleinitz, in Arnsberg, experimented clinically also with eucalyptus oil.

Abscess on the neck.—Incision; injection of water with 5 per cent. eucalyptus oil; bandage with eucalyptus lotion of the same strength; secretion reduced to a minimum; healing in 11 days.

Extensive burning of the leg through a solution of caustic potash.—Dressing with a bandage moistened with 5 per cent. lotion of eucalyptus oil; smooth healing in 6 weeks.

To supplement these important therapeutic records, as adduced by Professor Schulz, the following more recent cases have been selected:—

Dr. Keller, of Vienna, saw under his treatment of 432 cases of partly simple, partly complicated malarial fever, 310 cured by the use of eucalyptus, 202 getting only a single dose of the tincture, quinine having been given previously in 118 out of the 432 cases.

Dr. Wooster, of San Francisco, in a report on 120 cases of various diseases, treated exclusively with fluid extract of eucalyptus, gives the following results:—

Remittent fever	....	5	cases, all cured.
Intermittent fever	....	9	" " "
Typhoid fever	....	9	" " "
Nephritis	....	4	" 3 "
Diuresis	....	10	" 7 "
Incontinence of urine	....	3	" 3 "
Vesical catarrh	....	27	" 25 "
Blennorrhagia	....	13	" 10 "
Dysentery	....	4	" 3 "
Chronic diarrhoea	....	13	" 9 "
Gonorrhoea	....	16	" 10 "
Hypodrops	....	6	" 3 "

Whenever the cases did not yield to treatment, the condition of the patient became ameliorated.

We have the Testimony of some forty eminent European Physicians on the value of the Eucalyptus.

*Note. At these Exhibitions at Sydney, David Clarke received the Medals for the Eucalyptus Preparations, now on sale in San Francisco.

Californian Farmer.
August 28th 1884

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SYDNEY.